

# **Landsat 7 Ground Systems Overview**

# Agenda

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- Ground architecture overview
- Overview of each architecture element
- Future directions



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# Ground System Overview

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## ■ Requirements

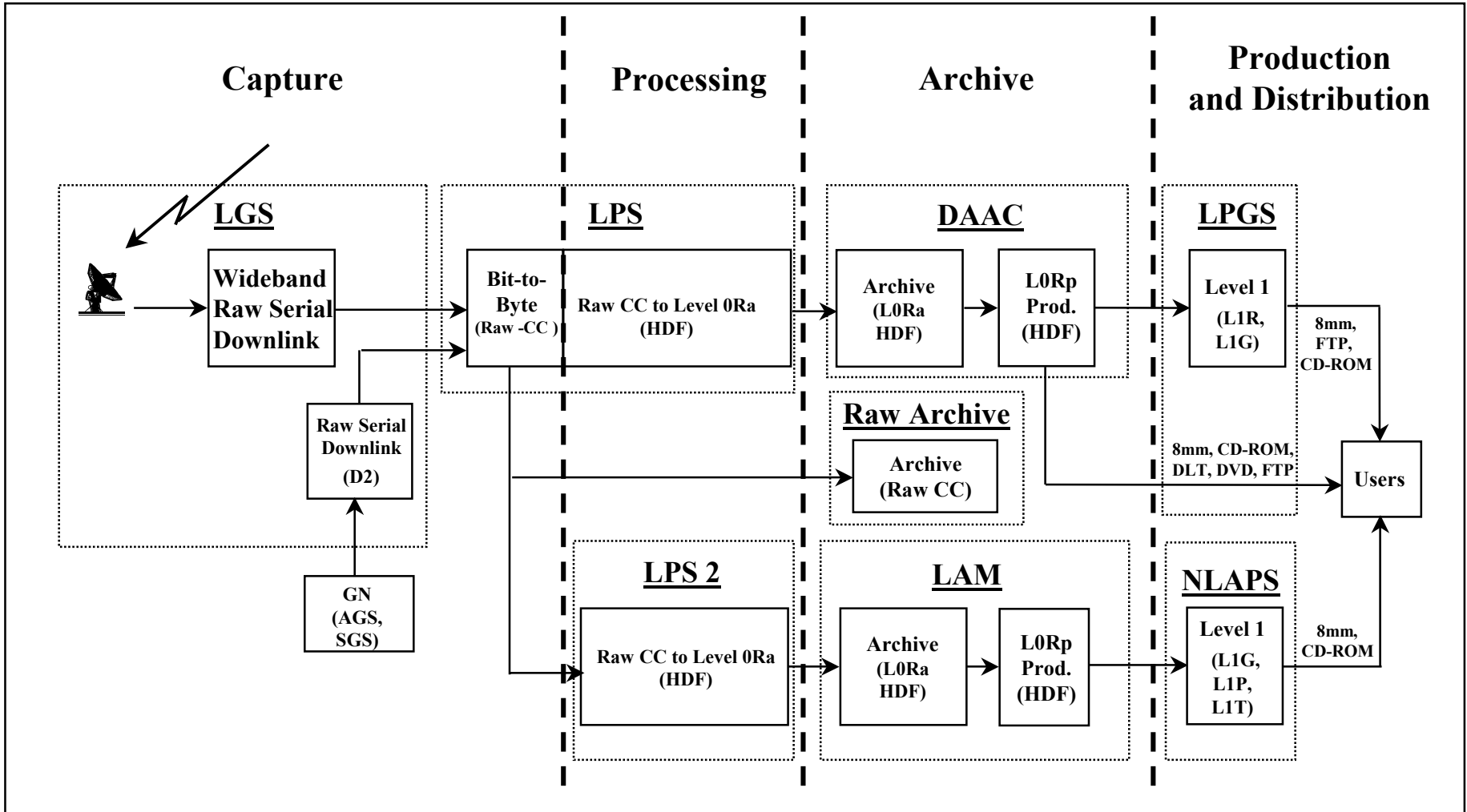
- Perform bent pipe T&C operations for Missions Operations Center (MOC)
- Receive and capture 140 scenes per day at EDC
- Process and archive 250 scenes per day; 140 EDC, 110 PGS
- Archive raw CC and L0Ra HDF data sets (2 x 154GB daily)
- Produce and distribute L0Rp, L1R, L1G, L1P and L1T products

## ■ Architecture Characteristics

- Single 10m aperture; X-Band mission, S-Band T&C
- 2 - 150Mbps QPSK downlinks (1 live, 1 SSR); can receive 3 D/L
- Distributed SGI based architecture; currently single mission oriented
- Currently re-engineering capture, processing, archiving functions; resulting architecture will provide multi-mission growth path



# Current Landsat 7 Architecture



# Landsat 7 Ground System (LGS)

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## ■ Purpose

- Provide communications with satellite for MOC and EDC ground systems

## ■ Characteristics

- 10m antenna - X and S Band capabilities
- Secure I/F to MOC for bent pipe T&C and contact scheduling
- Interface to LPS to provide wideband data for processing
- Includes a mixture of NASA purchased hardware
  - Datron, SA (ViaSat), AMPEX, and multiple other LRU vendors
- Two AMPEX DIS recorders provide storage and playback
  - Primarily support EPGN (AGS and SGS) data playback into LPS
  - Serves as temporary backup data queue



# Landsat 7 Processing System (LPS)

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## ■ Purpose

- Capture Landsat 7 raw wideband data from LGS
- Perform PN decoding, CCSDS handling
- Generate two long-term archive data formats
  - Raw computer compatible - serial bit stream in byte format (local DLT)
  - L0Ra - L0Ra HDF archive format (LPS1 I/F to DAAC, LPS2 I/F to LAMS)

## ■ Characteristics

- SGI Challenge XL based hardware (5 strings)
  - Two strings required for each 150 Mbps I and Q pair
  - Four total for operations, one contingency / testing
- Cannot perform capture and processing simultaneously
- Re-engineering will separate capture and processing
  - Capture and generation of raw CC on two O200s using Myriad Serial PCI cards
  - Processing and generation of L0Ra on single O2000



# Landsat 7 Archive Manager System (LAMS)

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- Purpose
  - Archive L0Ra data to D3 tape
  - Generate and distribute L0Rp (currently only for NLAPS)
- Characteristics
  - SGI Origin 200 based hardware
  - Currently utilizes manual tape handling - operator intensive
  - Re-engineering will introduce several improvements
    - Integrate Origin 2000 and STK Powderhorn 9310 (6000 slot) silo
    - Upgrade to STK 9940 drives (200GB) and storage area network
    - Archive and distribute Landsat 7 raw computer compatible data
    - Automate archiving and distribution activities
    - Modify design to facilitate other mission data types
    - Replace LPS as L0Ra provider to DAAC (ECS)



# Landsat 7 Product Generation System (LPGS)

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## ■ Purpose

- Generate Landsat 7 Level 1 products for distribution to customers

## ■ Characteristics

- Origin O2000 based hardware (16 CPU main, 8 CPU backup)
- Only produces Landsat 7 products
- Produces Level 1R and 1G utilizing PCD or definitive ephemeris
  - 250m spec, nominally 30 to 50m with definitive ephemeris
- Receives L0Rp from DAAC
- Utilizes PDS to distribute products via 8mm, CD-ROM, and FTP



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# National Land Archive Processing System (NLAPS)

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## ■ Purpose

- Generate Landsat 7 Level 1 products for distribution to customers

## ■ Characteristics

- Origin O2000 based hardware (8 CPU main processor)
- Software developed by MDA - “PGS” architecture
  - Processes Landsat 1-5,7 ETM+, TM and MSS data
- Produces Level 1G (PCD or def ephemeris), 1P, 1T
  - 250m spec, nominally 30 to 50m with definitive ephemeris
- Receives L0Rp from LAMS
- Utilizes PDS to distribute products via 8mm, CD-ROM, and FTP



# Future Directions

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- LPS and LAMS Teams executing re-engineering activity
  - Separate capture and processing functions
  - Augment LAMS capabilities
  - Migrate architecture to storage area network
  - Facilitate transition to multi-mission role
  
- Delivery schedule
  - Aug 21 - new LPS “LPS-NG”, data capture system, LAMS raw data archiving via silo
  - Dec / Jan - LAMS L0Ra and L0Rp via silo and I/F to DAAC (ECS)
  - TBD - storage area network integration; test bed in work

# Post Re-Engineering Landsat 7 Architecture

